

FACILITIES MAINTENANCE AND ENGINEERING PROCEDURE		
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1.0 PURPOSE

To define the general role and responsibilities of the Facilities Maintenance and Engineering (FME) personnel.

2.0 GENERAL

This procedure is intended to define only general responsibilities of the functions covered. Other procedures cover responsibilities for specific activities, such as preparing and issuing design documents.

3.0 PROCEDURE

3.1 Engineers, Designers, and Drafters

Engineers, designers, and drafters, are responsible for performing the detailed design work assigned to them. This may include any or all of the following functions:

- (a) Planning, preparing and checking calculations, and drawings for structures, systems and equipment.
- (b) Preparing and checking specifications, evaluating proposals, and recommending suppliers or subcontractors.
- (c) Coordinating individual activities with those performing related work in other groups, as well as those in specialty engineering groups, Clients, Suppliers, Constructors, and Subcontractors, as required.
- (d) Reviewing Suppliers' and Subcontractors' drawings, specifications, and quality programs for conformance to requirements.
- (e) Reviewing and employing applicable procedures, design standards and criteria, to assure conformance to project requirements.
- (f) Reviewing correspondence, bulletins, and other information available to become aware of potential problems and keep abreast of related activities elsewhere.
- (g) Employing generic design, standard specifications and design standards to the maximum feasible extent.
- (h) Seeking technical guidance from others where appropriate.

3.2 Project Lead Engineer

Each Project Lead Engineer is responsible for coordinating work assigned to the project. He is responsible to the Project Manager for meeting schedules and cost budgets, for coordinating work with other groups and for compliance with procedures and policies.

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The responsibilities of the Project Lead Engineer include the following functions, to the extent they relate to the tasks assigned, its scope of work, and where they are otherwise applicable:

- (a) Planning, Control and Administration
 - 1. Preparing or preparing input to the Project Manager for developing scope of work, a man-hour budget, and making revisions as required. Responsible for coordinating the development of man-hour budget at nominal 15% design stage.
 - 2. Advising the Engineering Manager of manpower requirements, project progress, and special problem areas.
 - 3. Providing input to the Project Manager for developing and updating schedules, in a timely manner. This includes communicating with the Project Manager on issues affecting scope, schedules, and budgets.
 - 4. Coordinating Project Reviews, including Review Meetings, for both inhouse and outsourced design.
 - 5. Initiate "Lessons Learned" at the completion of the project.
 - 6. Preparing or providing input to project correspondence for signature of Project Manager, and acting on incoming correspondence.
 - 7. Detecting possible scope changes resulting from client requests or any other reason and assessing the impact of these on cost and schedule, and reporting same to the Project Manager.
- (b) Coordinating with Client representatives, as delegated by the Project Manager, to communicate requirements and obtain approvals, to the extent consistent with the existing procedures.
- (c) Coordinating with working level representatives of other entities.
- (d) Accompany / Assist Project Manager in Customer and Construction Meetings as required.
- (e) Verifying that the work performed is done in a professional manner and in compliance with applicable procedures.
- (f) Assisting in preparing Conceptual and Fiscal Approval Estimates for area of responsibility.

3.3 Discipline Engineer

Each Discipline Engineer is responsible for developing and coordinating design in his area of expertise. He is responsible to the Engineering Manager for technical excellence for compliance with technical standards related to his discipline.

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The responsibilities of the Discipline Engineer include the following functions, to the extent they relate to the tasks assigned, its scope of work, and where they are otherwise applicable:

(a) Design Activities, including Planning

1. Determining and detailing output for his discipline. This includes preparation of design output and support documents and procurement documents.
2. Producing design work, in detail, and providing input to the overall Scope of Work, budget, and schedule. This shall cover requirements for engineering input information and commitments for output documents, including drawings, specifications, and procurement actions. In addition, the Discipline Engineer shall review the schedule requirements of Constructors, Suppliers and others covered by the Scope of Work and direct the efforts of their groups toward supporting these requirements.
3. Implementing Facilities Maintenance and Engineering procedures for design control.
4. Coordinate technical development of the project.

(b) Detailed Design

1. Determining the methods and practices to be used in the design. Performing walkdowns to determine existing conditions and to determine design details.
2. Developing data required for design, including studies, analysis, engineering estimates, and design calculations.
3. Coordinating design and otherwise resolving interface problems with other groups.
4. Preparing and checking drawings and specifications and interpreting their intent where necessary.
5. Preparing updated drawings to the as-built conditions from field markups, or reviewing those prepared by others, if required. This includes walkdowns to assure the installation is as per design.
6. Preparing input to purchase, contract, and subcontract documents for bids. Evaluating bids and recommending suppliers, contractors, and sub-contractors.
7. Reviewing and providing status to engineering and quality verification documents and change orders submitted by suppliers and subcontractors, as required.
8. First level of design checking at the various review and completion points.
9. Insure design meets requirements of all applicable codes and standards.

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- (c) Verifying that work performed is done in a professional manner and in compliance with applicable procedures.

3.4 Project Manager

The Project Manager (PM) is the focal point in the execution of the overall project. The PM is responsible for the overall activities on all phases of the project, including technical liaison on a day-to-day basis with the Client and with Construction. All formal communications with the Team shall be issued by, and should be directed to the PM. The PM is responsible to assure the team understands customer requirements and priorities. He also assures that project status is provided to the customer. He is responsible for keeping the status of the PFSR current and reporting on it monthly.

The responsibilities of the PM include the following functions, where applicable:

- (a) Implementing policies and procedures, as necessary to achieve completion in accordance with objectives related to quality, cost and schedule. Also, establishes such additional, specific requirements as necessary.
- (b) Initiating arrangements and coordinating requirements with other entities involved in supporting activities and in producing engineering documents.
- (c) Developing Project Scope.
- (d) Developing man-hour budgets and overall project costs and assuring change control is implemented.
- (e) Directing the preparation of project work plans and schedules.
- (f) Preparation of Cost Estimates.
- (g) Consulting with appropriate FME Management personnel regarding unique design problems and problems which are likely to significantly impact project scope, budgets, schedules, or other commitments.
- (h) Maintaining awareness of cost and schedule, particularly the impact upon them.
- (I) Maintaining close liaison with other project entities, including Engineering Manager, Project Controls and the Manager of Projects.
- (j) Perform interim evaluations and an overall performance assessment of an Architect Engineer in accordance with the FME procedure FMP-G-0065, Architect/Engineer Performance Evaluation.

3.5 Administration

Administration implements, and interprets administrative policies and procedures, and establishes administrative work standards.

The responsibilities include the following functions, where applicable:

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- (a) Establishing and maintaining the Document Control Center for handling all project communications and engineering documents internally generated or received from outside sources. This includes receiving, logging, reproducing, distributing, filing, retrieving and maintaining a tickler system for control of action items.
- (b) Distributing documents generated by FME personnel. This includes correspondence, manuals, reports; procedures, controls, lists, schedules and those purchase and subcontract documents issued by FME.
- (c) Maintaining forms control, to assure use of the latest revisions to forms.
- (d) Processing and coordinating administrative papers such as time cards, sick leave, vacation and overtime requests, and attendance records.
- (e) Controlling and distributing applicable procedures.
- (f) Preparing and making necessary revisions to other procedures, as required.

3.6 Cost Trend Engineer

A Cost Trend Engineer (CTE) is assigned to assist in maintaining control of project costs, arising from design development or other causes elsewhere in the project.

The responsibilities of the CTE include the following functions, where applicable:

- (a) Participating in defining the initial Project Scope and estimating the overall cost of the project.
- (b) Initiating and maintaining a Cost Trend Program, based upon a current budget, through coordination with the project team and the results of regular project cost trend meetings with the Project Team and FME management.
- (c) Initiating and maintaining a current Project Cost Trend Register, and providing cost information to the Project Team management as the project develops. Also, preparing, analyzing, and distributing Cost Trend Reports.
- (d) Assisting and participating, as required, in cost evaluation of alternate designs and in project cost forecasts, including obtaining requested cost information for the Project Engineering Team.

3.7 Contracting Officer's Technical Representative (COTR)

The COTR is responsible for monitoring and managing subcontracted construction projects to ensure compliance with the approved plans, specifications, and the intent of the program. The COTR serves as the Owners representatives sole point of contact during the construction phase of projects, acting as liaison between the subcontractor and FME Engineering staff, the various Maintenance shops, the Garrison, various Building Managers, the affected customers or Scientific Managers and others.

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The responsibilities of the COTR include the following functions, where applicable:

- (a) Monitors assigned construction projects for work performed by subcontractors
- (b) Assists in design reviews and attends review meetings, providing input for constructability and program requirements
- (c) Attends and participates in pre-bid meetings and conducts site tours
- (d) Participates in subcontractors technical evaluations if applicable
- (e) Attends and participates in pre-construction meetings
- (f) Checks equipment, materials, and supplies to be utilized for compliance by the subcontractor with the approved plans, specifications and shop drawings
- (g) Participates in RFI response preparation with A&E and/or Project Manager, providing technical, constructable, and operational input.
- (h) Reviews potential change orders with subcontractors, and assists the Project Manager in review of change orders for accuracy, validity and cost.
- (i) Receives and reviews subcontractors daily report forms, daily hot work permits, and safety inspection reports.
- (j) Performs periodic walk-thru inspection of project site for quality compliance, safety observation, submittal compliance, coordination concerns, policy adherence, schedule adherence, potential conflict resolution, observation of unforeseen/existing conditions, drawing and specification interpretations, witness of tests or inspections, and verification of test results.
- (k) Assess proper operation of systems during the commissioning test phases, in conjunction with the appropriate engineers.
- (l) Identifies routing and locations of various utilities for connections, shutdowns, and coordination with the Building Managers, for all affected parties.
- (m) Performs reviews of subcontractors red lined field drawings for completeness and accuracy.
- (n) Schedules and conducts bi-weekly progress meetings. If the contract for projects requires that the A&E or subcontractors conduct meetings, attends and participates in the progress meetings.
- (o) Prepares periodic evaluations of the subcontractors for workmanship and other compliance issues. Reviews these evaluations with Project Managers, the Construction Contracts department, and with the subcontractors.

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- (p) When requested by the subcontractor or if deemed necessary, attends and participates in the subcontractors coordination and scheduling meetings.
- (q) Keeps Project Managers apprised of all ongoing project activities and the issues/changes that may arise.
- (r) Reviews with subcontractors their invoicing status, and monitors and reviews the subcontractors written applications for payment.
- (s) Performs on site wage compliance review interviews with subcontractors staff.
- (t) Develops or assists in the development along with the A&E and Project Manager, the project punch list preparation and verification of work completed.
- (u) Coordinates for training, Startup, O&M walkthroughs, and acceptance with FME personnel, Garrison staff and scientific managers.
- (v) Administers all subcontractor and supplier warranty requirements for a period of one (1) year after project acceptance for completeness, upon determination from Operations and Maintenance, that an issue is the responsibility of the subcontractor.
- (w) Assists the program/end user with equipment requirements and interfaces with the move-in/retro fitting of equipment into new space.
- (x) Receives and verifies the closeout requirements for deliverables, spare parts, extra stock, and O&M manuals.
- (y) Checks A&E's final as-builts for completeness and accuracy.
- (z) Provide assistance and support to Project Managers and to the program end-users as requested.

3.8 Manager of Engineering

The areas of responsibility of the Manager of Engineering is identified below:

- (a) Establishes Engineering policy and procedures and provides overall direction and administration of engineering activities.
- (b) Provides direction to ensure that engineering activities are conducted in compliance with directives, policies and procedures.
- (c) Defines interdepartmental relationships to accomplish objectives.
- (d) Coordinates functions among engineering disciplines to ensure that engineering design meets department and project objectives and quality expectations.

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- (e) Provides direction for personnel development and training.
- (f) Ensures that an appropriate cross-familiarization occurs for technical advances, Engineering decisions on common technical areas, and management techniques.
- (g) Implementing a system for the control, maintenance, and distribution of engineering records, and for the timely transfer of custody after project completion.
- (h) Assuring that the design is performed in accordance with the existing procedures.
- (i) Reviewing and approving the issue of design drawings, engineering specifications, engineering-related studies, and purchase requisitions.
- (j) Coordinating activities of the various discipline groups and obtaining assistance from outside technical specialists, as needed.
- (k) Recognizing and rewarding excellence.